



# THULIUM

Element Symbol: **Tm**

Atomic Number: **69**

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The element Thulium (when purified from mineral ores) is a silver-grey lustrous metal. Thulium metal is soft, malleable and ductile, and is so soft that it can be cut with a knife.

The density is 9.32 grams per cubic centimetre: which is a bit lighter than Lead, but heavier than Iron, Copper, Nickel, and Tin.

The surface of the metal will readily tarnish in air and produce an oxide. Thulium will also burn readily in air. Thulium will react slowly with cold water, and quite quickly with hot water to form Thulium hydroxide and Hydrogen.

Thulium was named in honour of Thule: an ancient Roman name for a mythical country in the far North, which was probably Scandinavia. The first compound containing Thulium was discovered and named by Swedish Chemist Per Teodor Cleve (1840 – 1905) in 1879. Cleve made his discovery while studying the black-coloured rock that had been discovered around the town of Ytterby, Sweden in 1787. After removing all the other components from the rock the most interesting portion was where the Thulium accumulated because the solution possessed a bluish green colour. The compound was Thulium oxide (also called Thulia). Solid Thulium oxide has a pale green colour. The complete analysis of that rock took more than 100 years, and in the process nine new elements were discovered including Thulium.

Pure metallic Thulium was not produced until 1910 by Charles James (1880-1928) an American chemist.

Thulium is never found as the pure metal/element in nature. Thulium is only found mixed with other rare earth elements in minerals such as Monazite, Euxenite and Gadolinite. Its abundance is estimated at about 0.2 to 1 part per million in the Earth's crust: but this still makes it more abundant than Silver, Platinum, Mercury and Gold. The chief ores are found in China, USA, Brazil, India, Sri Lanka and Australia.

Lasers containing Thulium were used in the 8th generation Intelsat VI satellites (designed and built by the Hughes Aircraft Company, between 1983 and 1991, for Intelsat; the acronym for International Telecommunication Satellites). Natural Thulium has possible use in ferrites (ceramic magnetic materials) used in microwave equipment. Portable X-Ray devices use a Thulium isotope (produced by bombarded in a nuclear reactor to make the radiation source) to produce images used in medical, dental, and engineering diagnoses.

Thulium has been used in high temperature superconductors because it has unusual magnetic properties at very low temperatures.

Thulium currently has few commercial uses, because its high production costs have prevented other commercial uses from being developed.

*Provided by the element sponsor sponsor Pamela Hoobin*

## ARTISTS DESCRIPTION

Thulium is the least important element there is according to many people. It does not have many commercial uses although it is not rare. Thulium occurs naturally in rock as thulium oxide which has a pale green colour as depicted. Thulium is sometimes used as a coating on glass lamps to give a green light, like the eerie glow of this image. When Thulium is purified it is a soft and malleable metal. The lettering is metallic like thulium itself.

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